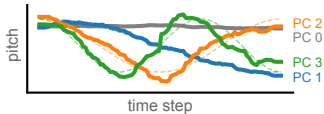**1. Observation**
Principal components of melodies approximate cosines

2. Explanation
Toeplitz variance structure

3. Proposal
cosine contour representation: use the discrete cosine transform

PC 2
PC 0
PC 3
PC 1

pitch

time step

pitch

pitch vector
piano roll
2d cosine contours

time steps

this contour
(15.3, 8.7)

c_2 (archedness)

coefficient c_1 (descendingness)